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The aging of Naval housing presents a unique painting problem. Over the years, many housing units have accumulated a buildup of numerous coats of paint. In order to restore the original condition, the damaged coatings must first be removed. This is generally accomplished with paint removers containing methylene chloride. Because this solvent may have adverse effects on personnel, alternative paint strippers were investigated. Five of the removers tested were liquids, and the sixth was a powder that was mixed with water before

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1. Paint remover 2. Coatings I. 52-089

The aging of Naval housing presents a unique painting problem. Over the years, many housing units have accumulated a buildup of numerous coats of paint. In order to restore the original condition, the damaged coatings must first be removed. This is generally accomplished with paint removers containing methylene chloride. Because this solvent may have adverse effects on personnel, alternative paint strippers were investigated. Five of the removers tested were liquids, and the sixth was a powder that was mixed with water before using. The paint remover containing methylene chloride, used as a standard for comparison purposes, performed best of all products tested in removing the paint. The alternative paint removers also removed the paint, but at a slower rate. Preliminary tests are required for each specific job to select the most effective paint remover and determine the most effective application procedure and schedule.

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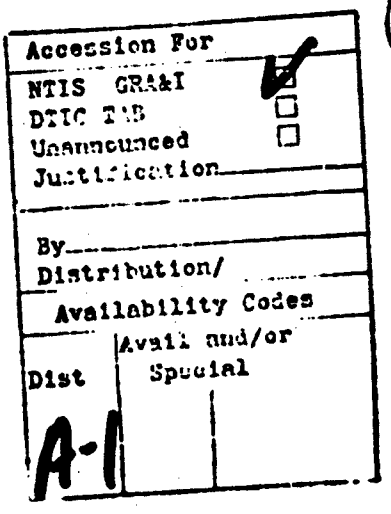

INTRODUCTION

Worldwide, the Navy has family housing/dwellings that include 45,681 buildings with a real property value of $1.5 billion (Ref 1). The schedule for painting the exteriors of these buildings is every 5 years for wood and every 15 to 20 years for stucco surfaces (Ref 2). Interiors are ordinarily painted every 3 years (Ref 2), usually during a change of occupancy, but are painted if the surfaces are unacceptable in appearance. In 1979, $5,952,921 was spent on painting the exteriors of 28,680 family housing units, and $14,157,887 was spent on painting the interiors of 28,282 units. Obviously, much maintenance money is required annually to protect the Navy's investment in housing.

Many of the housing units are at least 20 years old, and many coats of paint have been applied over the years. As each successive coat contracts upon weathering, the whole paint system becomes strained. The total rigid paint system cannot adjust well to the dimensional changes of its substrate during heating and cooling. Local areas crack and peel from the substrate to relieve the strain. After the localized areas of damage have been repaired, other areas begin to crack and peel to leave an irregular and unsightly finish. Repairs to local areas of mechanical damage further add to the unsightly appearance. In order to provide a smooth, pleasing finish to these surfaces, it is necessary to remove all the old paint, repair any damaged substrate, and repaint the entire surface.

For many years, paint removers containing methylene chloride have been used effectively to remove old paint. Concern is now being expressed over possible adverse safety, health, and environmental effects of methylene chloride (Ref 3) on personnel inhaling the fumes or contaminating their skin. Therefore, the Naval Facilities Engineering Command (NAVFAC) requested the Naval Civil Engineering Laboratory (NCEL) to investigate the use of environmentally acceptable alternative paint removers.

BACKGROUND

Exteriors of Navy housing units are usually built of wood or concrete/masonry (e.g., poured concrete, concrete block, stucco, brick, etc.) materials. Asbestos-cement siding is also common in some areas. The interiors of housing units are usually built of plaster, plaster board, or wood. A list of the recommended coating systems for each of these surfaces can be found in Reference 4.

Historically, alkyd (a modified drying oil paint) or unmodified drying oil paints have been used on wooden buildings, and the fact that these contained lead pigments has been of concern to environmentalists. Recently, interest has been expressed concerning adverse effects of organic solvents in oil-based paints polluting the air. Thus, more latex paints are being used for wood, and the use of oil-based paints is no longer permitted in California except for specific temporary exemptions.

Oil-based paints are chemically degraded by alkalinity and are not recommended for concrete/masonry surfaces. Latex paints provide a "breathing" type of paint film for concrete/masonry surfaces that allow the passage of water vapor. Latex paints are also very good on asbestos-cement siding. Chlorinated rubber and vinyl coatings are used when concrete/masonry surfaces need to be sealed.

Mechanical tools (sanders, grinders, etc.) can effectively remove old paint but are costly to use. Impact tools used for removing spots of deteriorated paint can damage the sound paint. Impact tools and abrasive blasting can also damage the substrate, particularly wood. Abrasive blasting is restricted in some areas because of air pollution by particulate matter.

Most paint removers for wooden or concrete/masonry buildings use methylene chloride (dichloromethane), which is chemically similar to chloroform (trichloromethane), but it is much safer to use. The odor of methylene chloride can be perceived at concentrations of 25-50 parts per million (ppm), and adverse health effects may occur if inhaled at concentrations above 500 ppm for prolonged periods of time. It is not photochemically reactive (does not contribute to the production of smog) and is exempted from the California Air Resources Board's restrictions on paint solvents. Methylene chloride is a thin (low viscosity), low-boiling liquid; thus, waxes are usually added to reduce the rate of evaporation and increase the solvent action time. Its solvent action causes the paint resin to swell so that the paint can be scraped away from the substrate. Some thermoplastic resins may actually dissolve.

Recently, paint removers containing no methylene chloride have been developed for use on wooden and concrete/masonry buildings. These removers usually contain caustic chemicals that degrade paint resins and cause them to swell. Alkyds are quite easily degraded (saponified) by alkaline chemicals. Suppliers and users of paint removers accept the fact that methylene chloride containing removers are much more effective at removing paint than the alkaline removers. Some suppliers have attempted to use organic solvents other than methylene chloride, but these are less effective.

Multiple component paints that cure by chemical reaction (e.g., epoxies, coal tar epoxies, polyurethanes, and polyesters) are much more difficult to remove than the alkyd and latex paints used on housing. Paint removers for these products must use special chemicals such as phenols or formic acid. Many suppliers sell only high strength paint removers for industrial purposes while others sell only paint removers appropriate for housing; still others sell both types.

Methylene chloride and alkaline paint removers require special care during use. Rubber gloves should be worn to prevent contact with the skin, and some type of shield should be used to protect the eyes and face. Any materials splashed on the body should be immediately removed by rinsing with water. Proper ventilation should be used with paint removers containing methylene chloride to prevent the fumes from accumulating. In all cases, the safety precautions provided by the supplier should be followed.

Some suppliers may refer to interior or exterior paint removers. Actually, there is no difference between interior and exterior paint removers except that more care must be taken indoors to prevent the

buildup of methylene chloride fumes. In all cases, care must be taken to avoid contamination of floors, grounds, etc. with paint or paint remover. Many suppliers sell several different formulations with minor variations (e.g. acid or ammonia activated methylene chloride). These suppliers recommend that several formulations be tested on the paint to be removed before a final selection is made.

The combination of a paint remover and water blasting was found quite effective in removing paint from the White House (Ref 5) and other historic buildings. With large buildups of oil paint, it is sometimes necessary to apply the remover more than once before the paint is completely removed.

EXPERIMENTAL TEST RESULTS

Laboratory and field tests were conducted to determine: (1) how effectively paint removers containing no methylene chloride removed paint as compared to removers that did contain methylene chloride, (2) the variation in effectiveness of nonmethylene chloride paint removers, and (3) criteria for the effective use of removers.

Six paint removers were tested in the laboratory to determine their ability to remove a buildup of oil-based and latex paints. One of the six was a methylene chloride remover used as a standard for comparison. Three of the other five removers were alkaline, one contained alcohol, and one was a proprietary environmentally acceptable remover. These removers were selected for testing because they are currently being used by Navy field activities. All six paint removers are identified in Table 1. A list of properties and descriptions of the removers tested can be found in the Appendix.

Laboratory testing was conducted on old hospital doors supplied by the Public Works Department, Naval Construction Battalion Center, Port Hueneme, California. These wooden doors had nine coats of paint that had been applied over the years and had received numerous nicks and other mechanical damage. The paint was shown by infrared spectroscopy to be predominantly latex. In the experimental design, the paint removers were applied to the painted doors as recommended by the suppliers and then removed after exposures ranging from 5 to 60 minutes.

Field data were received from the Officers Quarters at Yerba Buena Naval Station, Treasure Island, California, and the Officers Quarters at Great Lakes Naval Station, Illinois.

Laboratory Results

System 1. Rinse Paint Off (RPO) was applied to the hospital doors by brush by technical personnel from the supplier (Schroeder). The remover and loose paint were removed by wiping with water-soaked rags that were then rinsed in a bucket of water. The rags were used again and the removed paint was discarded. The remover is a proprietary product and is reported by supplier personnel to be biologically acceptable for discarding into a sewage system. (This, of course, depends on the type of paint removed. Coatings containing chromates or other heavy metals cannot be discarded into municipal sewage systems, but must be disposed of

by special means.) Figure 1 shows the remover applied to the test door. The remover initially reacted well with the coating but after 5 minutes, the reaction stopped. The longer term test spots were agitated by brushing to remove the spent remover from the surface of the coating, and a fresh coat of remover was applied to the underlying coating. The reaction then continued until the base wood was exposed.

System 2. Leeder's 700-W remover can be applied by brushing, rolling, or spraying. In this test, it was applied by a brush (Figure 2) and was removed by a wide-blade putty knife and water-soaked rags (Figure 3). The remover contains alcohol as its active ingredient and should not be harmful if it comes in contact with human skin. It was faster acting than the previously tested Rinse Paint Off. The product had a rather pleasant smell and a neutral pH.

System 3. Leeder's 667-W remover is highly alkaline. It was about as effective as Leeder's 700-W in removing paint from the wooden doors. Both products were also tested for removing a baked finish from aluminum siding. In this test, the 700-W was more effective than 667-W, probably because of the alcohol it contains. The latter has an offensive odor.

System 4. Peel Away is a powder which comes in a 2-pound package. It has received quite a bit of publicity, and NCEL was specifically asked by Southern Division, NAVFAC, to investigate this paint remover. The powder is mixed with water to form a thick paste which is applied by a special plastic spatula supplied for this purpose. In this test, the paste was applied to the bottom 32 inches of a test door as follows:

first 8 inches:	3/16 inch
second 8 inches:	5/16 inch
third 8 inches:	5/16 inch
fourth 8 inches:	3/8 inch

The "magic-fibre" Lifetex stripper cloth was then placed over the door and paste (Figure 4). Rubber gloves must be worn at all times when working with Peel Away, as it is highly alkaline and can irritate the skin.

The first stripper cloth was removed after 25 minutes. All the old paint had softened and most of it was removed with the cloth. Some paint and paste remained but was easily removed with a putty knife. The second stripper cloth was removed after 30 minutes. The old paint was stripped to the bare wood with all layers coming off fairly well (Figure 5). The remaining paint and paste were also removed by a putty knife. The third stripper cloth was removed after 35 minutes and its reaction was similar to the second stripper cloth. The fourth stripper cloth came off easily but left more paint on the door. It appeared that the paste was applied too thick for this remover to work effectively. The paste did not all soak in and adhere to the stripper cloth after 1 hour. The cloth was removed and the excess paint and paste were removed by a putty knife. The bare wood was treated with a 5% solution of acetic acid to neutralize the alkalinity of the paste.

A second test was done using Peel Away. An 8-inch strip of paste about 1/2 inch thick was applied and the stripper cloth was placed over it. After 15 minutes, one end of the stripper cloth was lifted but only about 2 to 3 layers of the coatings were soft enough to be removed. After 20, 25, and 30 minutes, the stripper cloth was lifted but the coatings were still not soft enough to be removed. After 45 minutes, the paste had worked its way through to the bare wood and the coatings were lifted when the stripper cloth was removed (Figure 6).

There is no offensive odor with this remover and it is easy to work with. Its main drawback is the time required for its use. There seemed to be no advantages of using the stripper cloth when compared to conventional paint removing techniques.

System 5. El Pico was used as the standard methylene chloride paint remover for comparison purposes. It was applied with a 2-inch-wide nylon bristle paint brush. There was an immediate reaction between the coating and the remover (Figure 7). The coating rapidly swelled and burst. After 12 to 15 minutes, the softened paint could be removed to the bare wood by scraping with a putty knife. This was the fastest acting paint remover of those tested. It also had the most offensive odor. The offensive odor may serve as a means of insuring that large concentrations are not allowed to build up.

System 6. Zep LS is an alkaline liquid which is diluted with water and applied at high temperatures. In the laboratory test, 1 pound of the compound was diluted with 1 gallon of water (the highest concentration of product recommended by the manufacturer) and heated to approximately 40°C (104°F). The solution was then brushed on the door that had a minimum of 5 layers of old paint. The solution failed to thoroughly wet the surface of the door, it had a tendency to bead up like water, and the technician had to keep dabbing at the surface to keep the door wet. The test spots were scraped with a putty knife at intervals of 5, 10, 15, 20, 25, 30, 45, and 60 minutes. After 30 and 60 minutes the paint was removed to bare wood, although at 45 minutes this did not occur, probably because of localized differences in the paint build up. The results are shown in Figure 8.

Field Results

The Officer's Quarters, numbers 1 through 7, at the Yerba Buena Naval Station are large frame houses (Figure 9) built before the 1906 San Francisco earthquake and are listed with the National Historical Society. The houses are constructed of redwood and needed to be repainted.

An alkaline paint remover, Zep LS compound, and a steam generator, Figure 10, were used to remove the old paint from Quarters No. 2. Zep LS can be applied by brush, roller, or spray. For this application it was applied by a brush and allowed to remain for 2 hours before rinsing off with hot water (180°F) at 1,800 psi (Figure 11). A second coat of Zep LS was applied and left on for 50 minutes before rinsing off (Figure 12). A third coat was applied and left on for another 50 minutes before rinsing (Figure 13). As can be seen, most of the old coating was removed; any that remained was removed by power or hand sanding.

Zep LS is highly alkaline so care must be taken to properly protect the skin and eyes. Plants and shrubbery should be covered with plastic drop cloths and whenever pools of the remover collect, they should be diluted with copious quantities of water and washed into the gutter. Zep LS was left on overnight in order to remove the paint more easily. Figure 14 is Quarters No. 2 after the paint had been removed.

Navy Public Works Center (PWC) Great Lakes, Illinois, requested that NCEL recommend a paint remover for use on the interiors of their officers' quarters. A gallon of Leeder 700-W (System 2) was selected and sent with instructions on how to use it. The remover was tested on various interior coated surfaces and was well accepted by PWC personnel. It was quite safe to use and contained no odor; however, it is much slower acting than the solvent-based remover previously used. PWC placed an order for 20 gallons of Leeder 700-W and used it satisfactorily on quarters E, A.A, and 202 to remove oil-base paint and varnish. In one application, it did an exemplary job of removing old varnish from a set of banisters (Ref 5).

DISCUSSION

It is obvious from the test results that the paint remover containing methylene chloride performs much better than those that do not. This is consistent with the opinion currently held by most suppliers of paint removers. It is, therefore, logical that continued use of this paint remover should be made, but care should be taken in regard to its use. While alternative removers can be used, they require more time to remove the paint and are more costly to use.

Field investigations suggest that preliminary tests be conducted on paint to be removed from housing to assist in: (1) selecting the most effective paint remover, and (2) determining the best application procedure and schedule. The paints encountered on housing can be removed with all the paint removers with no problem, but metal components may be coated with epoxies or other coatings that require stronger products. A time/motion study can help determine the most cost-effective, step-by-step procedure.

All the products investigated can be handled safely if necessary precautions are taken. Similarly environmental pollution (air and soil) can be effectively controlled.

CONCLUSIONS

1. Paint removers that contain methylene chloride are more effective at removing paint commonly found on housing than other paint removers that do not contain methylene chloride.

2. Both types of paint removers can be used safely, if the necessary precautions are taken.

3. Paint removers that do not contain methylene chloride remove paint slowly. These paint removers can be effectively used on housing, but at a greater labor cost.

4. Of the five paint removers tested that do not contain methylene chloride, Systems 2, 3, 4, and 6 performed better than System 1. The stripper cloth technique of System 4 did not provide any practical advantage over conventional methods of removing paint.

RECOMMENDATIONS

1. All paint removers should be used with caution by following the guidance provided by the supplier.

2. Paint removers containing methylene chloride should be used as long as they are legal and considered safe.

3. Preliminary tests should be done to determine the most effective product, procedure, and schedule to be used for removing paint from large areas of housing.

ACKNOWLEDGMENT

The author expresses his appreciation to the personnel of the offices of the Resident Officer in Charge of Construction, San Francisco Bay, for permitting tests on various quarters under his jurisdiction and for the assistance of NCEL personnel, Ms. Nathalie Milliken, Mr. Charles Mathews, and Mr. Jim Dettbarn for preparing and conducting the experimental tests.

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1. NAVFAC P-319. Statistical tables of military real property, Sep 1982.

2. Ms. Louise Miller. Telephone conversation, Naval Construction Battalion Center, Code 83, and Mr. L. Schwab, NCEL, Code L52, of 27 Sep 1983.

3. N. Irving Sax. Dangerous properties of industrial materials, Fifth edition. Van Nostrand Reinhold Co., 1979.

4. NAVFAC MO-110. Paints and protective coatings, Jun 1981.

5. P.G. Campbell, G.A. Sleater, and M.A. Post. Development of guide specifications for the 1980 exterior restoration of the White House, National Bureau of Standards, NBSIR 80-2122. Oct 1980.

6. Mr. Hal Link. Telephone conversation, NCEL representative to Great Lakes Naval Training Center, and Mr. L. Schwab, NCEL, Code L52, of 28 Sep 1983.

Table 1. Paint Removers Investigated

System	Remover	Type	Manufacturer
Laboratory Investigations			
1	Rinse Paint Off (RPO)	Proprietary (not specified)	Schroeder Process Corp. P.O. Box 11294 Santa Ana, CA 92711 (714) 730-1888
2	Leeder 700-W	Alcohol	Leeder Chemical, Inc. 16961 Knott Avenue La Mirada, CA 90638 (714) 739-2821
3	Leeder 667-W	Alkaline	Leeder Chemical, Inc. 16961 Knott Avenue La Mirada, CA 90638 (714) 739-2821
4	Peel Away	Alkaline	Dummond Chemical Dept. PWWB-346 Dummond Place Glen Head, N.Y. 11545
5	El Pico	Methylene Chloride (used as standard)	Sta-Lube Inc. 3039 Ana Street Compton, CA 90224 (213) 537-5650
6	Zep LS	Alkaline	Zep Manufacturing Co. 2970 Corvin Drive Santa Clara, CA 95050 (415) 739-3656
Field Investigations			
2	Leeder 700-W	Alcohol	Leeder Chemical, Inc. 16961 Knott Avenue La Mirada, CA 90638 (714) 739-2821
6	Zep LS	Alkaline	Zep Manufacturing Co. 2970 Corvin Drive Santa Clara, CA 95050 (415) 739-3656

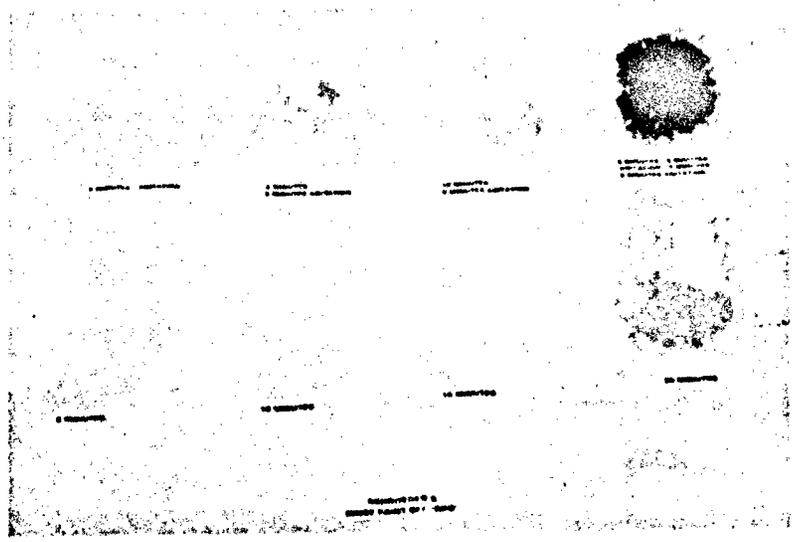

Figure 1. Effects of Schroeder's Rinse Paint Off (RPO) on painted door.

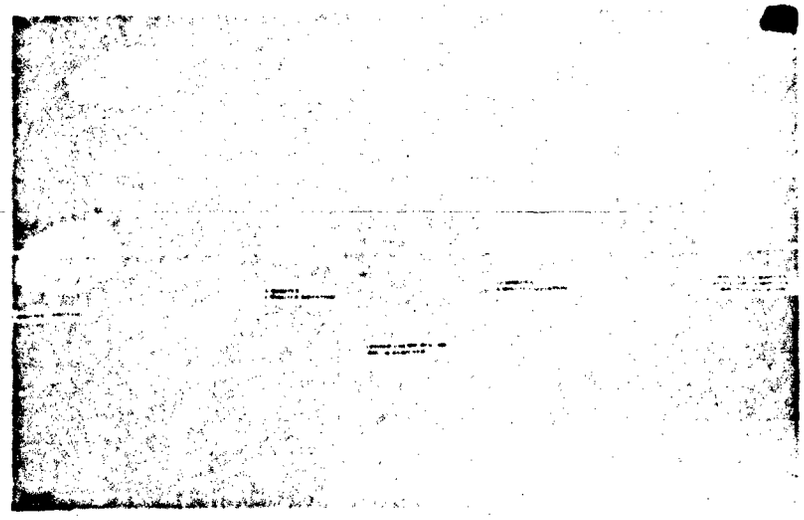

Figure 2. Leeder's 700-W paint remover applied to painted door.

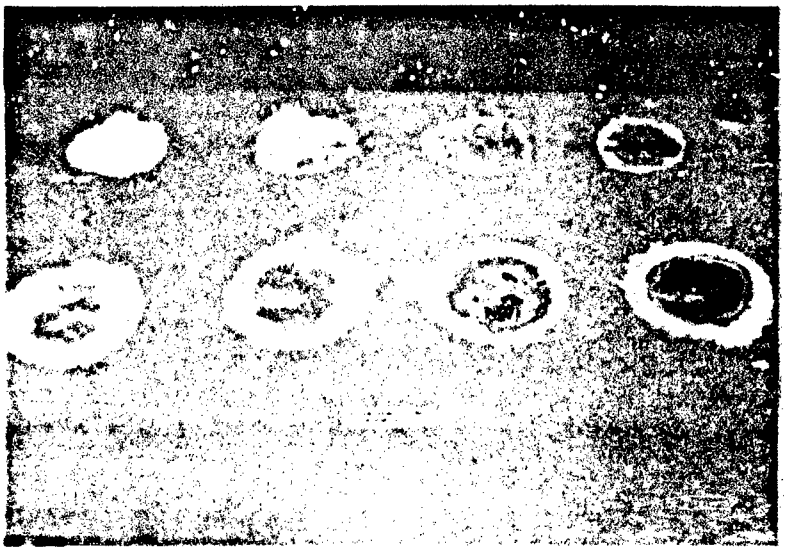

Figure 3. Effects of Leeder's 700-W paint remover on painted door.

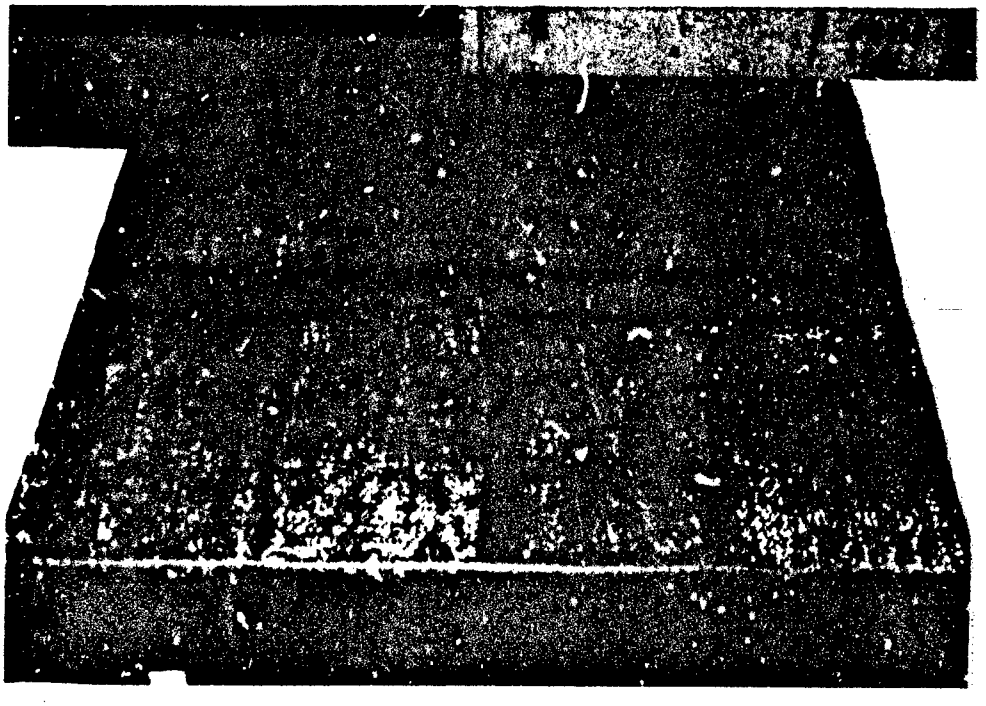

Figure 4. "Magic-fibre" stripper cloth placed over Peel Away paste.

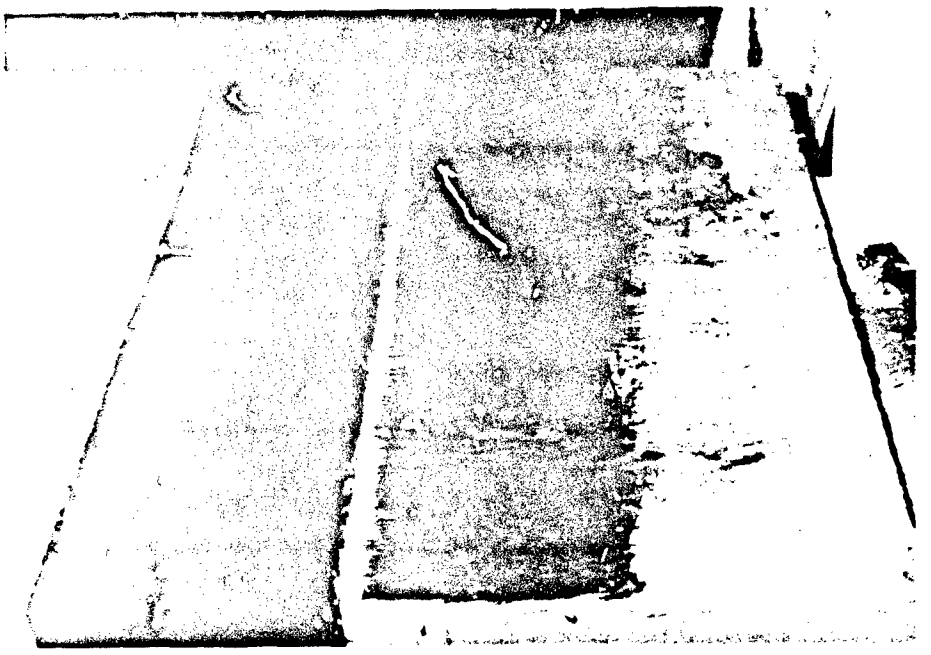

Figure 5. Old coating removed using Peel Away.

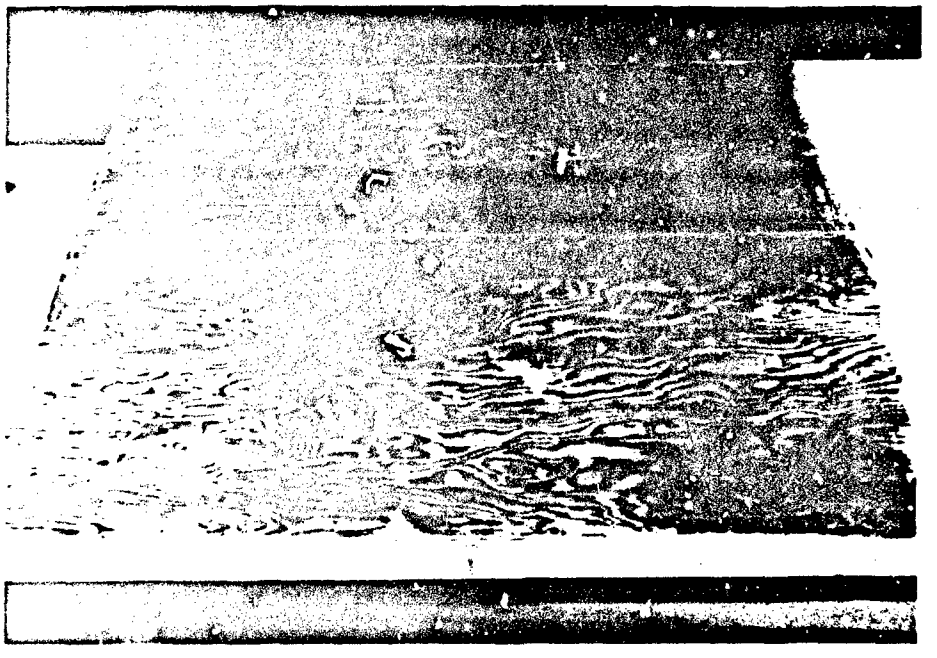

Figure 6. Peel Away paint remover in various stages of use on the painted door.

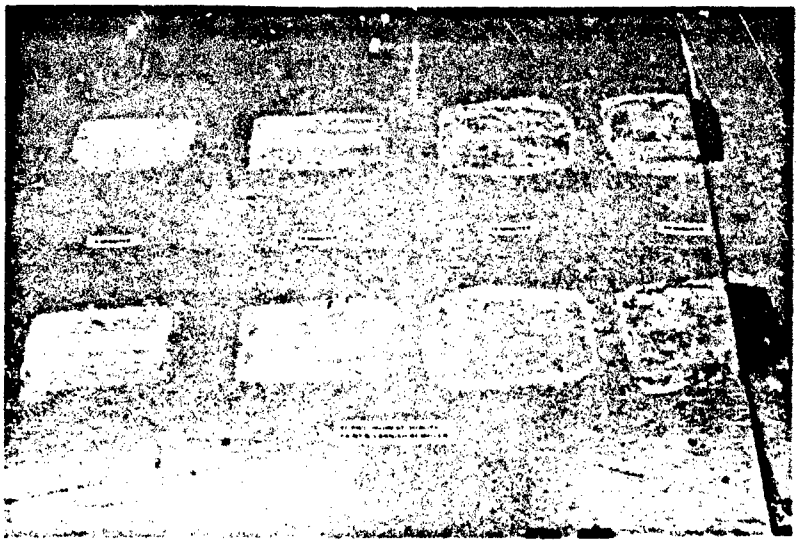

Figure 7. Effects of El Pico (methylene chloride) paint remover on the painted door.

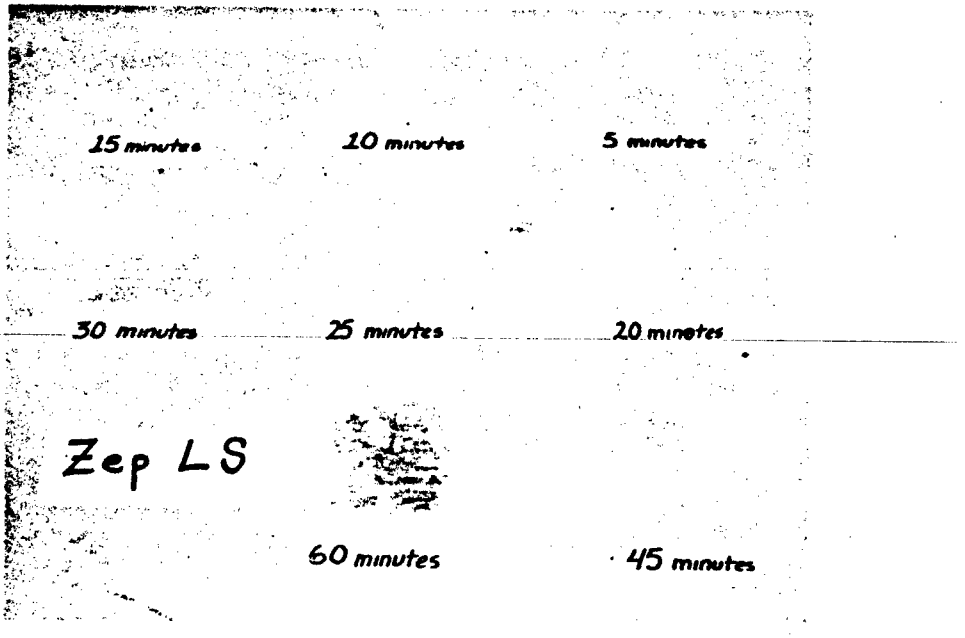

Figure 8. Effects of Zep LS (alkaline) paint remover on painted door.

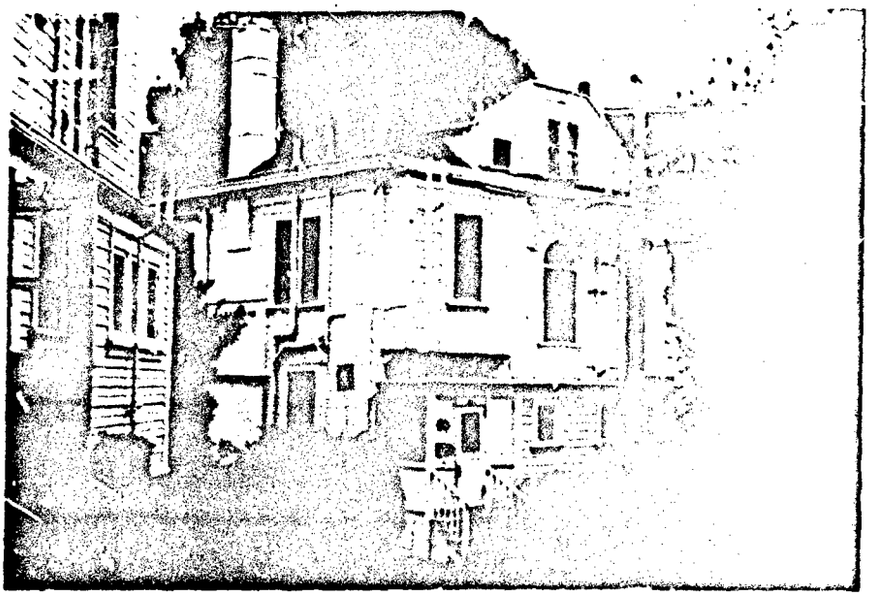

Figure 9. Officer's quarters at Yerba Buena Naval Station, Treasure Island, Calif.

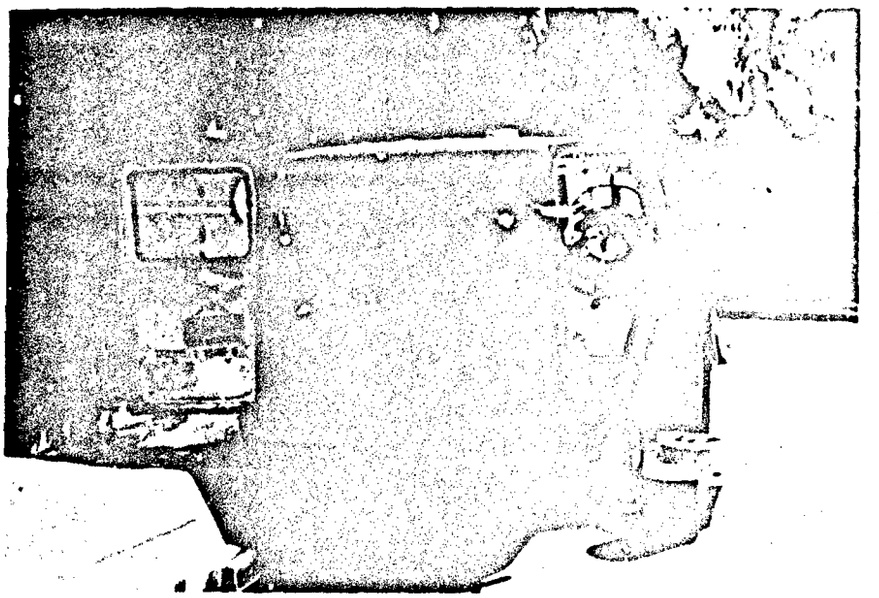

Figure 10. Steam cleaning generator used with paint remover Zep LS.

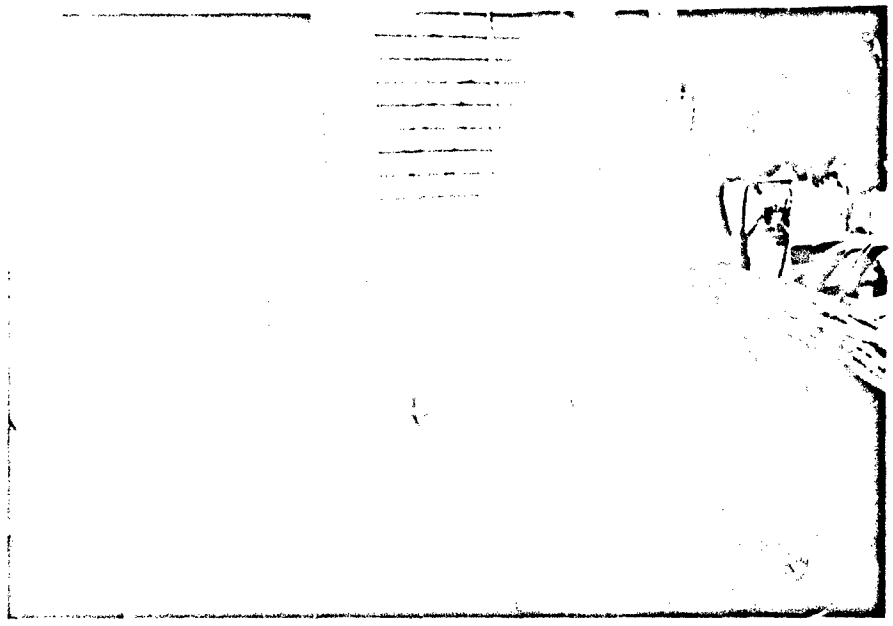

Figure 11. Zep LS paint remover applied to side of Quarters No. 2.

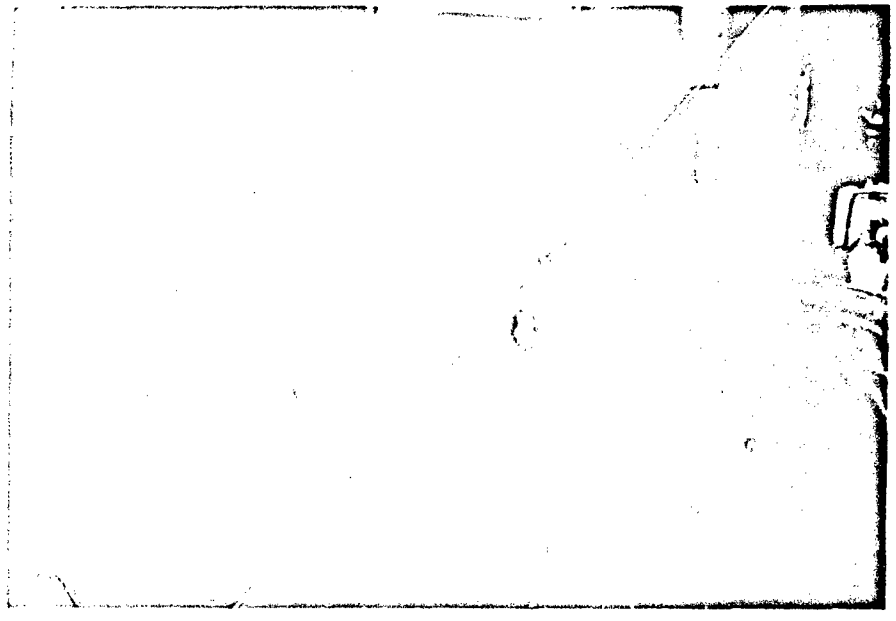

Figure 12. Result of using second coat of Zep LS paint remover after first rinse.

Figure 13. Result of using third coat of Zep LS paint remover after final rinse.

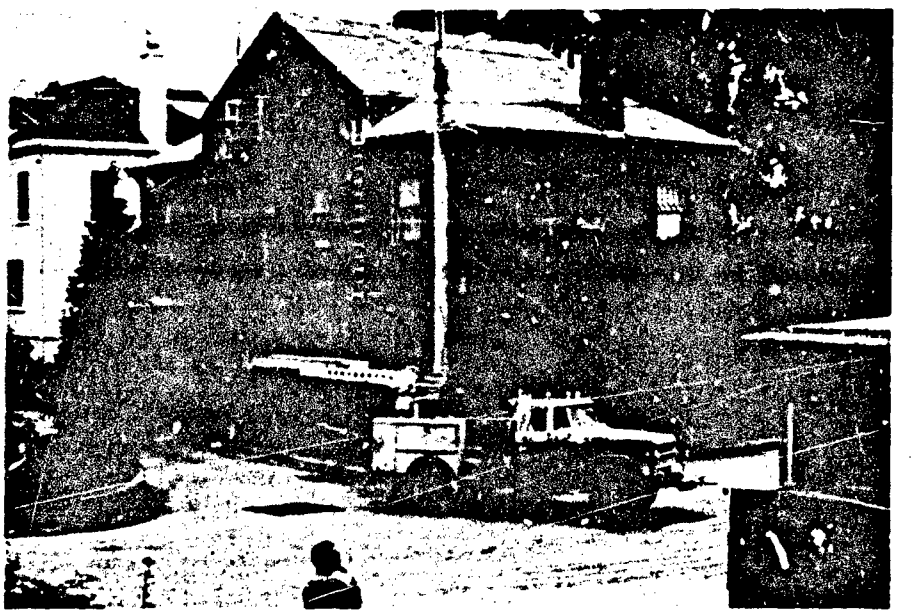

Figure 14. Quarters No. 2 after being treated with Zep LS paint remover.

Appendix

LIST OF PROPERTIES AND DESCRIPTIONS OF THE PAINT REMOVERS SUPPLIED BY THE MANUFACTURERS

Leeder 700-W Paint Remover

Description:

Leeder 700-W is a thick, stripping compound formulated specifically for removing Alkaline Removable Protecting Coatings.

Properties:

- Clings to vertical as well as horizontal surfaces
- Non-flammable
- Water rinsable
- Heavy bodied pink liquid
- Non-corrosive to metals
- Non-acidic
- No after-neutralization needed
- Biodegradable

Use Instructions:

Concentration: Apply Leeder 700-W full strength, as received.

Equipment: Leeder 700-W may be applied to surface being stripped by brush, mop, spray, or immersion.

Stripping: Leeder 700-W should be allowed to dwell on the coating to be removed for 3 to 5 minutes.

Removal: Leeder 700-W and coating residues may be removed readily by rinsing with cold water at high pressure.

Precautions: FOR INDUSTRIAL USE ONLY. Though no special precautions are necessary in using or handling this product, prolonged skin exposure may dictate wearing protective gloves. If splashed into the eyes, flush with large amounts of water. If irritation persists, obtain medical attention.

Leeder 667-W Paint Remover

Description:

Leeder 667-W is a thick, non-flammable, yellow-colored cleaner which is very versatile.

Properties:

- Excellent cling on vertical or horizontal surfaces
- Non-phenolic
- Non-flammable
- Non-separating
- Water rinsable
- Safe for use in ovens

Use Instructions:

Leeder 667-W is used as received and applied by brush. Allow material to remain on surface until all the paint is loosened. Once Leeder 667-W has been allowed to penetrate and lift, simply remove it with damp rags.

Caution:

Leeder 667-W contains caustic soda. Avoid contact with skin, eyes and clothing. Refer to product label for additional precautionary and handling information.

Physical Data

Boiling Point (°F): N/A
Vapor Pressure (mm Hg): N/A
Vapor Density (Air=1): Greater 1.0
Solubility in Water: Completely
Specific Gravity (H_2O=1): Paste
Percent, Volatile by Volume (%): Over 50%
Evaporation Rate (Butyl Acetate): Less 1.0
Appearance and Odor: Yellow Paste - No objectional odor

Fire and Explosion Hazard Data

Flash Point (method used): None to boiling
Extinguishing Media: N/A
Special Firefighting Procedures: None required
Unusual Fire and Explosion Hazards: None
Flammable Limits: N/A

Health Hazard Data

Threshold Limit Value: N/A
Effects of Overexposure: N/A
Emergency and First Aid Procedures:

Skin: Wash with water. Follow with boric acid or vinegar wash.

Internal: Give vinegar, juice of lemon, grapefruit or orange. Obtain medical attention.

Eyes: Wash with copious amounts of water for at least 15 minutes. Obtain medical attention.

Reactivity Data

Stability: Stable - Avoid direct contact with acids.
Incompatibility: Acids
Hazardous Decomposition Products: None
Hazardous Polymerization: Will not occur

Spill or Leak Procedures

Steps to be taken in case material is released or spilled: Wash down area with water
Waste disposal method: Flush to sewer with large amounts of water. If required, neutralize with boric acid

Special Protection Information

Respiratory Protection: None required
Ventilation: Local Exhaust - Recommended
Mechanical - Recommended
Protective Gloves: Rubber Gloves
Eye Protection: Goggles
Other Protective Equipment: Protective Aprons

Special Precautions

Precautions to be taken in handiing and storing: Contains caustic potash. Handle and store accordingly.
Other precautions: Avoid contact with skin, eyes and clothing. Do not take internally.

Peel Away Paint Remover

MIXING

(1) ALWAYS MIX COMPLETE CONTENTS OF PLASTIC PACK. Unused paste will keep for several months if kept in container with lid firmly closed.

(2) Shake contents of pack well down. Cut across top of pack with scissors and empty powder into container. Add water gradually into container till mixture is thick and consistent - refer to the following table for the quantities of water necessary for mixing.

Powder	Water
1 lb Polybag	1-1/2 pints
2 lb Polybag	2-1/2 pints
4 lb Polybag	5 pints

(3) Add more water if you think it is necessary, however, resultant paste should be thick enough to stick to special "PEEL-AWAY spatula" without dropping. Leave for 10 minutes before applying.

THE BLANKET

This serves two purposes, the first is to prevent the paste from drying out, the second is to hold the paste and paint, and contain the mess that is associated with stripping paint.

If the blanket is too large it becomes difficult to handle, so you are advised to use the blanket in thin strips of 8 inches x 3 feet long. Using smaller strips also has the advantage of being easier to replace the blanket, if the stripping action of the paste is not completed.

When removing the blanket, try to keep the blanket and paste together by lifting the paste with the curved end of the tool, peeling back the blanket at the same time keeping the paste and blanket together. When using the blanket over molding, press the blanket well so that when the paste begins to set and adhere to the blanket, it will take up the pattern and drag the paint/paste right out of the crevices, etc. WHEN USING THE BLANKET, PLEASE ENSURE THAT THE SMOOTH SIDE IS FACING YOU, AND THE SIDE WITH THE RAISED PILE OF FIBRES IS PRESSED INTO THE PASTE SURFACE.

APPLYING

Protect floor covering with several layers of newspaper or plastic sheeting.

(1) Apply a thick covering of the paste to the painted surface with the applicator, or for large areas a pasterers' float and board. Work paste well into crevices, etc. Try to work within an area that can be covered by the blanket.

(2) Wet blanket in soapy water, wring out and apply to pasted surface. It is self-adhesive.

(3) Varnished surfaces - test after half-an-hour. Painted surfaces - test after two hours.

VERY IMPORTANT: IF THE BLANKET IS BEGINNING TO DRY OUT BEFORE THE STRIPPING ACTION IS COMPLETED, MOISTEN THE BLANKET CAREFULLY WITH WET SPONGE OR SPRAYER.

REMOVING

"Peel Away" works by dissolving and absorbing the paint, therefore, the time it takes depends on the type, age and thickness of the paint, and can take from half-an-hour to several hours. However, four hours is the average for old paint, and a good indication that the paint is ready to be removed is when the paste turns brown.

(1) Peel back the blanket and test small area with the stripping tool. If bare surface is exposed continue to remove blanket with one hand, and with the other help lift off the paint with the plastic stripping tool, keeping paste/paint and blanket together as much as possible. Scrape surplus paste/paint from blanket and wash well in hot, soapy water.

(2) Any remaining paste is removed by adding a cupful of vinegar to a pail of warm water and then gently scrubbing the stripped surface down. Rinse off with single strokes with a sponge soaked in clean water and vinegar, which is rinsed between strokes. For large areas, change water frequently. Finally, wipe all over the surface with a cloth soaked in neat vinegar.

Any paint which may be left is best removed with a further coat of paste, since if you attempt to pick or chip small areas off, you will end up with a blotchy surface. This, of course, will not matter if you intend to re-paint the surface. Leave the stripped surface for at least 24 hours in a well ventilated area before attempting any further renovations.

NOTE: If paint is clearly softened but does not lift when Liftex blanket is raised, paint may be removed by using our stripping tool; or if using any standard spatula (with metal edge) make sure in doing so, that surface is not marred by a metal edge.

RE-USING THE BLANKET

If you wish to reuse the blanket, put it into a bucket of hot soapy water, then pull the blanket halfway out of the bucket and insert the sharp end of the tool between the layers of paint and the blanket. This should remove most of the paste/paint. Leave the blanket to soak for a little while, and finally wash well in hot clear water.

RE-ASSEMBLY OF BLANKET

After cutting, blanket can be re-assembled by heat welding* i.e., overlap by 1/2-inch two sections to be joined, run flame from gas lighter quickly over 1/2-inch edge of lower section, pressing down top section as you go. TAKE CARE NOT TO BURN THROUGH THE BLANKET.

RE-USING PASTE

It is possible to re-use the paste if fresh powder is mixed with the old paste, but no guarantee is given as to its effectiveness since it depends on how much paint has been absorbed.

*Dry blanket first.

El Pico Paint Remover

Test Description	Results
Viscosity, Zalm Cup #4	40-50
Non-volatile matter, % by weight	5
Ash, % by weight	Almost nil
Loss by evaporation, % by weight	95
Flash point, T.O.C.	Over 80°F[a]
Pounds per gallon	10
Phenol	None
Cresols	None
Fixed alkalies	None
Methylene chloride, % by weight	75
Carbon tetrachloride	None
Water, % by weight	Almost nil

[a]This product is generally regarded as non-flammable; however, under circumstances, over head vapors can "flash". Keep away from heat, sparks and open flames.

ZEP LS Compound Paint Remover

Properties:

- Highly alkaline formulation
- Effectively removes heavy deposits
- Powerful enough for the toughest cleaning jobs
- Capable of economical, high dilution for medium-duty cleaning
- Dissolves instantly
- Effective in hard or soft water
- Rinses clean, leaving no residue
- Will strip paint
- Will not stop-up steam machines

Composition and Characteristics:

ZEP LS Compound contains a high percentage of strong alkaline cleaners for effective removal. It is formulated to insure effective cleaning in hard water. As a liquid, it goes into solution instantly.

Directions and Suggested Uses:

The proper concentration of ZEP LS Compound can be determined from the following ranges, according to need.

For Light to Medium Duty Cleaning: Use two to six ounces of ZEP LS Compound per gallon of water.

For Medium to Heavy Duty Cleaning: Use six to twelve ounces of ZEP LS Compound per gallon of water.

Caution:

KEEP OUT OF REACH OF CHILDREN. Causes severe burns to skin and eyes. Harmful if swallowed. Contains strong alkali. When handling, wear goggles or face shield. In case of contact, immediately flush with water; for eyes, flush with water for at least 15 minutes and get medical attention. Do not allow material to come into contact with clothing. Do not use on aluminum.

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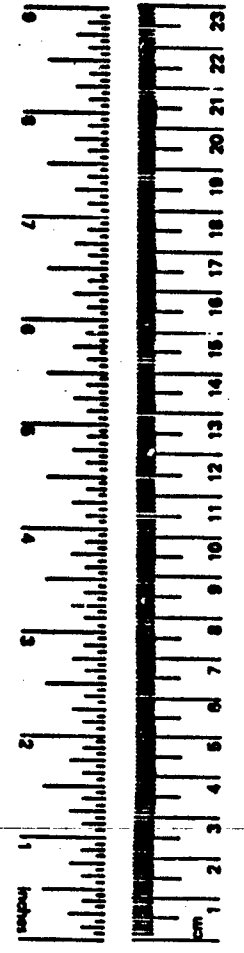
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

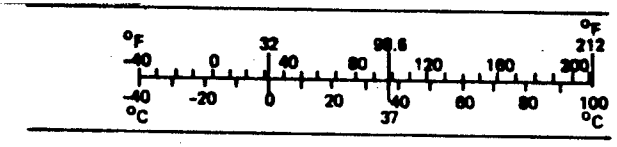
Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (weight)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2,000 lb)	0.9	tonnes	t
		VOLUME		
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
		TEMPERATURE (exact)		
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price $2.25, SD Catalog No. C13.10:286.



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1,000 kg)	1.1	short tons	
		VOLUME		
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
		TEMPERATURE (exact)		
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



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